

Yasuhiko ENDO* & Hiroyoshi OHASHI*: **Chromosomes of five
infraspecific taxa of *Vicia venosa* (Leguminosae) in Japan**

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種内分類群の染色体

Vicia venosa (Willd. ex Link) Maximowicz occurs widely in Eastern Asia. We found that this species is differentiated into five local forms in Japan (Endo & Ohashi 1986). They are var. *glabristyla* Endo & Ohashi, var. *stolonifera* Endo & Ohashi, var. *yamanakae* Endo & Ohashi, var. *cuspidata* Maxim. f. *cuspidata* and var. *cuspidata* f. *minor* (Nakai) Ohwi. Hence, we examined somatic chromosomes of these five infraspecific taxa to find good additional differences between them and to know degrees of differentiation in chromosomes.

Chromosome numbers of *V. venosa* var. *venosa* were reported to be $2n=12$ using a plant from Northern Mongolia (Měsíček & Soják 1969). A species close to *V. venosa*, *V. baicalensis* (Turcz.) B. Fedtsch., was reported also to be $2n=12$ in plants of China (Mettin 1961) and Northern Mongolia (Měsíček & Soják 1969). This species has so far been treated as *Orobis venosus* Willd. ex Link β . *baicalensis* Turcz., *V. venosa* var. *baicalensis* (Turcz.) Maxim. or *V. ramuliflora* (Maxim.) Ohwi f. *baicalensis* (Turcz.) P. Y. Fu & Y. A. Chen. The last species, *V. ramuliflora*, appears to be similar to *V. venosa*, but its chromosome number is $2n=28$ (Mettin & Hanelt 1968) in a plant cultivated in the Botanical Garden in Moscow where its exact origin is not known. Polyploidy has been known in *V. amoena* Fisch., *V. japonica* A. Gray and *V. unijuga* A. Br. of the section to which *V. venosa* belongs (Mettin & Hanelt 1968).

Materials and methods Localities and voucher specimens of plants investigated in this study are shown in Tab. 1.

For observation of somatic chromosomes, after pretreatment with 0.002 M 8-hydroxyquinoline solution for 3 hr, root tips were fixed with 1:3 mixture of acetic acid and ethanol for 10 min at 6°C. Then they were stained with hydrochloric carmine over one day and macerated in 45% acetic acid for 10 min at 60°C before squashed. A nomenclature for centromeric position on chromosome

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Tab. 1. Localities, chromosome numbers and voucher specimens of the plants examined.

<i>Vicia venosa</i>	Locality	Chromosome number	Voucher specimen in TUS
var. <i>glabristyla</i>	Niigata Pref., Itoigawa-shi, near Rengeonsen-spa, Heimanotaira moor	2n=12	Y. Endo 2741
var. <i>stolonifera</i>	Kyoto-fu, Kyoto-shi, Sakyo-ku, east side of Mt. Kurama-yama	2n=12	Y. Endo 2742
	Mie Pref., Inabe-gun, Daian-machi, Mt. Ryugadake	2n=12	Y. Endo 2745
var. <i>yamanakae</i>	Ehime Pref., Higashiuwa- gun, Nomura-machi, Onogahara	2n=12	Y. Endo 2758
var. <i>cuspidata</i> f. <i>cuspidata</i>	Toyama Pref., Tateyama, Senjyugahara	2n=12	Y. Endo 2743
	Nagano Pref., Shimotakai- gun, Nozawaonsen-mura	2n=12	Y. Endo 2744
var. <i>cuspidata</i> f. <i>minor</i>	Kumamoto Pref., Aso-gun, Aso-machi, Futae-toge	2n=12	Y. Endo 2746

applies correspondingly to that by Levan et al. (1964).

Results and discussion All of the five infraspecific taxa of *V. venosa* examined in the present study have 12 somatic chromosomes (Fig. 1 & Tab. 1). This is same as that of previously reported chromosome numbers in somatic cells of *V. venosa* var. *venosa* and *V. baicalensis* (2n=12, x=6, diploid), but different from those of *V. ramuliflora* (2n=28, x=7, tetraploid).

We can distinguish six pairs of chromosomes in these taxa (Fig. 2). The 1st and 2nd pairs are somewhat longer than the rest, the 1st, 3rd and 5th pairs are submetacentric chromosomes, while the 2nd and 6th ones are metacentric. The 4th pair is subtelocentric (Fig. 2). These centromeric position of chromosomes are same as seen in the six pairs of *V. baicalensis* (Měsíček & Soják 1969). We can find no differences between the five infraspecific taxa of *V. venosa* in Japan in karyotypes.

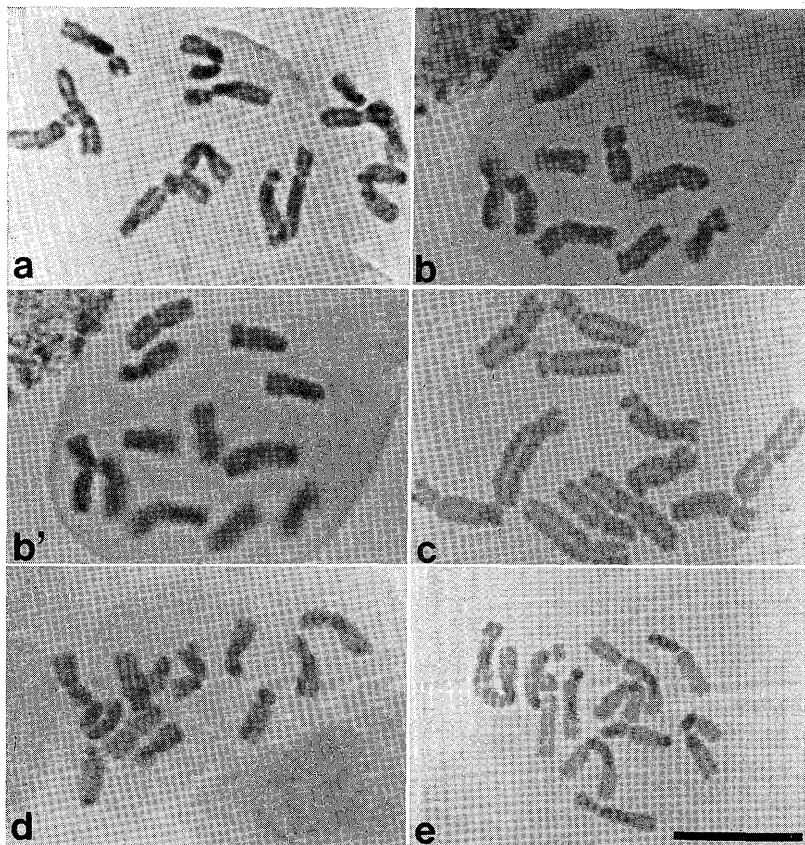


Fig. 1. Somatic metaphase chromosomes of *Vicia venosa* in Japan. a: var. *glabristyla* (Y. Endo 2741). b, b': var. *stolonifera* (Y. Endo 2745). c: var. *yamanakae* (Y. Endo 2758). d: var. *cuspidata* f. *cuspidata* (Y. Endo 2744). e: var. *cuspidata* f. *minor* (Y. Endo 2746). Scale bar indicates 0.01 mm.

References

- Endo, Y. & H. Ohashi 1986. Variation and infraspecific diversity of *Vicia venosa* (Leguminosae) in Japan. Sci. Rep. Tohoku Univ. 4th ser. (Biology) 39(2): 121-141. Levan, A., K. Fredga & A. A. Sandberg 1964. Nomenclature for centromeric position on chromosomes. Hereditas 52: 201-220. Měsíček, J. & J. Soják 1969. Chromosome counts of some Mongolian plants. Folia Geobot. Phytotax. 4: 55-86, pls. 1-6. Mettin, D. 1961. Die Chromosomenzahlen.

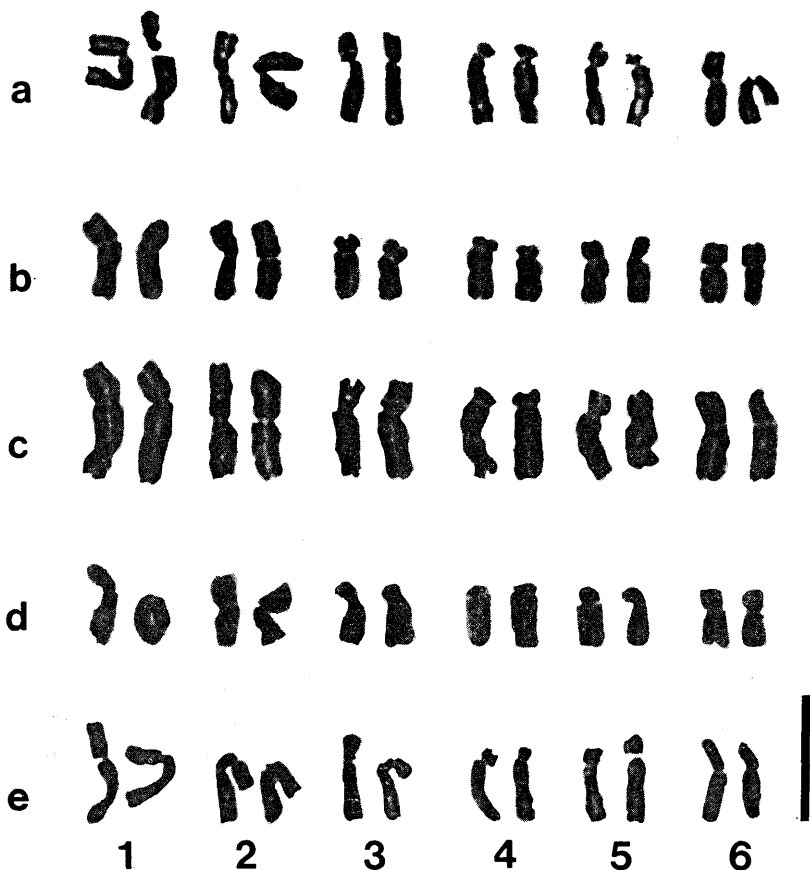


Fig. 2. Serial arrangement of chromosomes of *Vicia venosa* in somatic metaphase. a: var. *glabristyla* (Y. Endo 2741). b: var. *stolonifera* (Y. Endo 2745). c: var. *yamanakae* (Y. Endo 2758). d: var. *cuspidata* f. *cuspidata* (Y. Endo 2744). e: var. *cuspidata* f. *minor* (Y. Endo 2746). Scale bar indicates 0.01 mm.

einiger bisher nicht untersuchter *Vicia*-Arten. Kulturpflanze 9: 37-44. —
& P. Hanelt 1968. Bemerkungen zur Karyologie und Systematik einiger Sippen
der Gattung *Vicia* L. Feddes Repert. 77: 11-30.

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Vicia venosa (Willd. ex Link) Maximowicz は東アジアに広く分布するが、日本
においては地方的な 5 型に分化している。このうち 2 型は従来から知られているエビラ

フジ var. *cuspidata* Maxim. f. *cuspidata* とヒメヨツバハギ var. *cuspidata* f. *minor* (Nakai) Ohwi であるが、他の3型は昨年(1986)我々が新しく記載した変種である。第一はシコクエビラフジ var. *yamanakae* Endo & Ohashi と名付けた型で、徳島・高知・愛媛県の集団がこれに属し、これまでのこの集団はヒメヨツバハギに当てられていた。学名は四国のフロラ解明に大きな貢献をされている高知大学山中二男博士に献名した。第二はシロウマエビラフジ var. *glabristyla* Endo & Ohashi と名付けた型で、白馬山麓の新潟・長野県に分布する。第三はビワコエビラフジ var. *stolonifera* Endo & Ohashi と名付けた型で、岐阜・三重・滋賀県、京都府に分布する。第二・第三の型に属する集団は共に従来はエビラフジに当てられていた。これらの詳細は東北大学理科報告第4輯(生物学) 39(2): 121-141 (1986) に発表したのが、主な区別点は次のとおりである。

1. 小葉の二次側脈は生時に下面で不明。最も長い小葉で長さ 1.0-2.5 cm, 最も幅の広い小葉で幅 0.5-1.5 cm。花柱有毛。根茎は細長く、地下性匍匐枝がある
.....シコクエビラフジ
1. 小葉の二次側脈は生時に下面で明らか。最も長い小葉で長さ 2.0-8.0 cm, 最も幅の広い小葉で幅 1.0-3.0 cm..... 2
2. 花柱無毛。根茎は短く、地下性の匍匐枝を欠く.....シロウマエビラフジ
2. 花柱有毛..... 3
3. 根茎は細長く、地下性匍匐枝がある.....ビワコエビラフジ
3. 根茎は短く、地下性匍匐枝を欠く.....var. *cuspidata* Maxim.
4. 最も長い小葉で長さ 2.0-4.0 cm, 最も幅の広い小葉で幅 1.0-2.0 cm。小葉は卵形または楕円形で先端は鋭形.....ヒメヨツバハギ
4. 最も長い小葉で長さ 2.5-8.0 cm, 最も幅の広い小葉で幅 1.0-3.0 cm。小葉は卵形で先端は鋭尖形または尾状に伸びる.....エビラフジ

本研究ではこれら5種内分類群の体細胞染色体の観察を行なった。その結果、全て $2n=12$ であり、6対の染色体を区別することができた。6対はやや大型の2対と残り4対よりなる。大型の2対の内1対は次中部動原体染色体(submetacentric chromosome)であり、他の1対は中部動原体染色体(metacentric chromosome)である。残り4対は次中部動原体染色体2対と中部動原体染色体1対、そして次端部動原体染色体(subtelocentric chromosome)1対からなる。以上により、5種内分類群間で核型に違いが無い事が明らかとなった。